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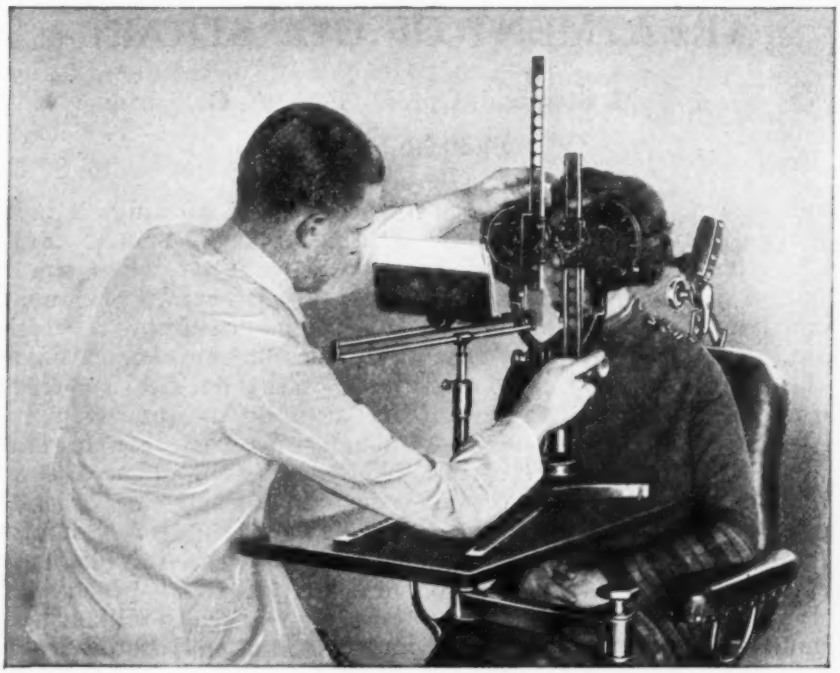

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AMERICAN JOURNAL OF OPTOMETRY

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TREATMENT OF EYE STRAIN

M. Steinfeld, Opt. D., F. A. A. O.

Paducah, Ky.

Eye strain formerly spoken of as asthenopia was, until recent years believed to be the result of excessive accommodation due to hypermetropia, or to unequal accommodation due to astigmatism. But we know today that it is also largely due to a lack of coordination of the functions of the eyes, principally of accommodation and convergence due either to an error of refraction, an abnormal condition of accommodation or the extrinsic muscles, or possibly of all three. Before the proper treatment of any case of eye strain can be decided on, a diagnosis must be made of the condition of all functions of the eyes, and herein lies the difference between the real optometrist and the "spec fitter."

As long as an optometrist merely examines eyes and fits them with glasses, he will remain in the minds of his patrons a "spec seller" or "merchant," no matter how scientific his work may be. There are many who do not get relief from wearing their glasses, even when they are correct or apparently so. Many eyes take a quite different correction after the muscles have had treatment, from what they accepted before. Much prestige is lost by insisting that the glasses will be all right when the patient gets used to them, and reputation is made by the optometrist who gives relief by treating the extrinsic muscles, perhaps without even changing the glasses.

Every optometrist is familiar with the symptoms of eye strain, but he pays too little attention to the individual symptoms and what they may mean. Do you have headaches, is almost invariably answered yes, but often it is an eye ache and not a headache. Headache is the most common symptom that we have, but it is more often due to an error of refraction than to the extrinsic muscles. Eye ache usually described as behind the eyes, sometimes the eyeballs feeling sore, especially on rotating, is indicative of strain on the extrinsic muscles. It may be relieved when the refractive error is corrected, but sometimes not, and may not improve until muscle exercises are given. Aching in the back of the neck is frequently caused by strain on the internal recti muscles, usually in weak convergence. The ache starts at the base of the skull and runs down each side of the neck toward the shoulder. Sometimes it is relieved by the refractive correction, due to the relief given the internal recti by relaxing a cilliary spasm. Frequently it is not, but if from the eyes it will stop after two or three muscle exercises.

Real dizziness is a complaint not commonly found. What is frequently complained of really isn't dizziness at all, but an unsteadiness, and when due to the eyes, is always caused by a lack of enervation to the extrinsic muscles. The patient should be carefully questioned about how he is affected. Dizziness will often be present in the morning on awakening or will sometimes be felt while lying down. Unsteadiness due to the eyes on the other hand, is felt principally in walking and is noticed more, in turning quickly to look at something. The head does not swim as when dizzy, but the patient feels uncertain of himself.

All of the various tests necessary for a complete diagnosis of the condition of the ocular functions are quickly made, and there can be no excuse on account of time required, for neglecting to make a complete examination. It is not the purpose of this article to go into a discussion of different methods, but to give those which the writer has found in his experience, to give the best results, both in diagnosis and treatment with the least expenditure of time and effort.

Assuming that the case has been carefully refracted by whatever methods the individual optometrist favors,

it becomes important to know what treatment may be necessary before the case can be conscientiously dismissed as free from eye strain. What we want to know is—does this correction serve the accommodative needs sufficiently, or is accommodation weak. Is convergence strong or weak? Have we corrected the case fully or is part of the defect due to cilliary spasm which we have not relaxed? Can we expect relief from this correction, or shall we tell this patient that treatment will probably be necessary?

Beginning twenty-three years ago when I started practicing, I adopted the plan of putting treatment lenses on all of my cases, except presbyopes, where reasonably correct glasses are being worn, and on all presbyopes who complain of any ocular discomfort. And as the years have passed I have become more and more convinced that it is the only professional and scientific method of practicing optometry. Professional because it gains the confidence, support and co-operation of the patient. Scientific because no perfect refraction is possible when the ocular functions are not normal and they cannot be normal if the eyes are suffering from strain. Much fuller corrections of both hypermetropia and astigmatism are given in this way. One who has followed this method for some time will be surprised at the changes he will make on the second examination, when he felt sure he was correct on the first.

Come backs and complaints are eliminated. There is no telling the patient the glasses are correct, he will get used to them. He knows the glasses are for treatment, and that if he still has trouble when he comes back he is going to be given further treatment. Only a small stock of lenses is necessary for the purpose as weak spheres and cylinders in thirty-eight and forty round are all that are necessary. The patient is not fogged or overcorrected in the treatment glasses, but given the fullest correction he will accept, and in large defects is undercorrected in his first glasses. The practice of putting on glasses that blur vision and make the patient uncomfortable, is as unnecessary as a cycloplegic except in cases of esophoria of considerable amounts. If the ocular functions are made to harmonize, the optometrist should know when he has given a sufficiently full correction.

The patient is instructed to wear these treatment glasses for two weeks and return for another examination, except where the ache behind the eyes and soreness of the eyeballs are very bad, in which case he is instructed to return in three days if not considerably improved. In extreme cases lieve the aching if possible. Headache in which there is no aching of the eyes or soreness will usually not require the muscle treatment, but if due to eye strain will be relieved by the refractive correction.

The condition of the extrinsic muscles must now be considered. But no matter what this may be, the treatment glasses are first worn before any treatment is given. If this be done there will be fewer prisms prescribed and those that are, will be given with a certainty that they are actually needed. Much more importance is given to the muscle balance at infinity than it deserves. Orthophoria or supposed perfect balance signifies nothing, as we may have orthophoria with very low ductions and much suffering. A small amount of esophoria, one or two dioptres also tells nothing. With a greater amount of esophoria we should add an extra quarter or half dioptre in our treatment lenses according to the amount of esophoria, and pay special attention to the abduction. A small amount of exophoria is almost always an indication of convergence weakness while as much as 5 degrees is usually a real exophoria and not due to the weakness of the interni. Exophoria of as little as 5 degrees rarely gives trouble if convergence is normal, while greater amounts probably will, and prisms will be required.

The rotary prisms of the phorometer present the easiest and quickest way of taking abduction and adduction but the method as usually carried out of turning until the light doubles and taking this as the amount of duction, is misleading. *This duction that gives the information needed for clinical purposes is that point at which the lights can be fused when reducing the prism after doubling.*

muscle treatments are given daily for two or three days beginning when the treatment glasses are put on. If the ache is from eye strain and not from some systemic cause, or some nasal trouble, it will invariably be much improved in three treatments. Should he return in three days with the ache not improved he is then given three or more muscle treatments to re- The prisms should be turned slowly increasing until the lights double. Then gradually decreased until the lights fuse. This should be done several times and the point at which the lights fuse recorded. In abduction the lights will in most cases fuse as soon as the prisms are reduced one degree, but occasionally we find one in which there will be apparently a normal abduction, but the prisms must be reduced three or four degrees before fusing, each attempt going lower, indicating poor abduction. Adduction on the other hand shows a stronger power after several attempts have been made. The old rule, that abduction and adduction should be three to one, and that abduction is normally eight degrees and adduction twenty-four degrees, should be relegated to the scrap heap, along with the rule that as long as they are three to one and orthophoria exists everything will be all right. Abduction of eight degrees is a rarity, and most cases show about five. No case will give trouble with five, if other functions be normal. With low abduction we may expect accommodative spasm.

A low adduction is an indication of convergence weakness. However it is difficult to tell just what amount of adduction one has as accommodation is frequently used to assist in holding the light single. This can be demonstrated by putting before the eyes the full correction and having the patient watch the normal line of letters while turning prism base out. As long as the letters can be read, accommodation is not used. If they can be read with as much as twelve degrees we have a fairly good adduction. It is safe to say that a low adduction as shown by the lights staying apart until the prisms are reduced to about eight degrees or less indicates a convergence weakness, but an apparently strong adduction may be a false condition, and the balance at the reading point, the adduction or convergence reserve at the reading point, and the near point of convergence, are more important in indicating the condition of convergence. An exophoria at thirteen inches of more than the physiological five or six, indicates convergence weakness, but unless it is as much as ten, it is not of any importance.

The convergence reserve or adduction at thirteen inches should be taken with a vertical line of type. As in taking all ductions, the prisms should be rotated until the line doubles and then slowly reduced until brought together, which indicates the true convergence reserve. Twenty-four degrees is considered a normal amount, although as low as twenty may be considered sufficient. With a good convergence the line after doubling will be brought together as soon as the prisms have been reduced three or four degrees. Frequently the line will be held single until eighteen or twenty degrees are reached, but will not be fused until reduced to six or eight, which shows the true condition of the convergence. Abduction at the close point gives no information of clinical importance.

The simplest and one of the most reliable tests of convergence is the near point test. A pin with a small white head is brought slowly toward the nose until it is seen double, or one eye turns outward. This gives the near point of convergence. Three inches or closer is a normal convergence. Four inches while weak may not give trouble while farther than four inches means a weak convergence that may be expected to cause strain and discomfort in close work.

The most satisfactory information regarding accommodation is given by dynamic skiametry. With the correction in place the patient fixes on letters on the side of the skiascope. Observation should be at sixteen inches, which is the customary reading distance. The amount of with motion remaining indicates the amount of accommodation which is lacking for the point at which the eyes are converging. Convergence is the predominating function of the two. We know that the eyes must converge perfectly for any given point or double vision will result. Accommodation on the other hand need not be exerted to an

exact amount in order to read. Accommodation may become quite deficient before reading becomes impossible. Normally below the presbyopic age, with the eyes fixing at sixteen inches, a with motion will remain after the eyes are fully corrected, which will be neutralized with plus seventy-five. It is unnecessary to go into a discussion at this time, of why this is so. The writer's belief is that it is the amount we normally undercorrect to allow for the natural tonicity of the cilliary, just as this amount must be allowed in fitting by the use of cycloplegic. This is proved by the fact that in presbyopia the reading correction is the amount that stops the with motion, cilliary tonicity being lost.

If more than plus seventy-five is required to neutralize the with motion, two conditions may exist; either accommodation is insufficient, or there is an undercorrection, and it becomes necessary to ascertain which. Frequently accommodative weakness accompanies convergence weakness, and accommodation improves with convergence treatment. No test is made so quickly and yield such valuable information as does this one with dynamic skiametry. You are able to see for yourself what accommodation is doing, and with practice there will no longer be any question of the correctness of presbyopic corrections.

All of these tests are made in no more time than it takes to read about them, and with the information so gained we are able to make a diagnosis of the condition of our patient's eyes and decide on our treatment. We know if we have an excess of with motion and cannot increase our correction, that we have weak accommodation or cilliary spasm resisting correction. And we may expect also to find weak convergence. By comparing the adduction both at distance, and close, the muscle balance at thirteen inches, and the near point of convergence, we are able to decide whether convergence is sufficient.

Many years ago I tried the method of Gould of having the patient exercise at home with loose prisms, and becoming discouraged with the result, finally gave it up. It seemed difficult to get the patient to carry out the treatment as directed. I decided that exercising could only be done successfully at the office by the optometrist himself, and proceeded accordingly for many years. There were always the same objections to this lack of time and inability of many patients to pay sufficient to justify the treatment. Yet many could be given complete relief in no other way, and treatment was given only when absolutely necessary. As time went on and practice increased it became more and more apparent that I could not afford to give time for muscle treatments. About two years ago I again adopted home exercising in cases of weak ductions, and have since been more successful in treatment cases than ever before. I decided that as my time was limited I would treat only those persons who would co-operate with me. At the beginning of the treatment, the condition is carefully explained, and the patient is told the result is entirely with him. It is explained to him that the treatment can be given at the office at a much greater cost, but that the same result can be obtained by home exercising, and that I have not time to give the office treatments, and do not care to make an unnecessarily large bill. The results since I began this system have been most gratifying. Many more cases are given treatment than formerly. The financial returns while less on each case, have been greater in the aggregate for the time spent. More efficient eyes have been given to a greater number of people, and my prestige as a specialist in my line, has been increased.

To carry out this method of treatment, a supply of square prisms is needed. Most of those used are five, ten and fifteen degrees. A few will be needed in three, four and six. They can be bought uncut square and the edges smoothed, or will be finished by the prescription house. Most of the treatment given is for weak convergence. The patient is instructed to measure a space twenty feet long and place a candle or other small light at one end. He is instructed to stand about three feet from the light and place a prism over each eye with the thick side toward his temples, the prisms being perfectly straight. He is started with about five degrees more than his adduction. If his adduction was eight, he will be able to fuse about fifteen when close to the light,

(a ten over one eye and five over the other). If not, he is instructed to use a ten over one eye only. He now backs slowly away holding the light single. If it doubles before he gets back twenty feet he removes the prisms, and goes up to his light and starts over. When he can get all the way back without the light doubling he increases five degrees. This is continued, exercising a few minutes several times a day until he can back holding fifty degrees. This is secured by placing a ten over a fifteen on each eye. As a rule adduction is built up very quickly this way. When he is able to back using fifty degrees, he is told to exercise by standing twenty feet from the light and placing prisms base out before his eyes using the greatest amount with which he can pull the lights together. The amount is from ten to twenty less than that with which he can back. These are held before the eyes and the lights brought together, then removed and placed there again. This gives the muscles a more rapid action as well as greater innervation. To increase abduction the patient is furnished a prism one degree stronger than that with which, base in, he can fuse the lights. He is told to place on the wall twenty feet away from him, a sheet of writing paper, ordinary note size. He now holds the prism base in before one eye then the other, fusing the paper. When he can fuse it easily every time, he should cut it smaller, reducing it as fast as he learns to fuse, until he can fuse the light. Then he is given a prism one degree stronger. He **does not** back away in exercising abduction.

It is best to give only a limited strength of prisms at a time, and have him report before giving more, the first time being within three days, so that we may know that he is carrying out the instructions properly, and after that at least once each week. If he reports often the patient works more faithfully. It requires only a few minutes each time to ascertain how much improvement he has made. This can be done by holding prisms before his eyes with his glasses on, and quickly seeing how much he can fuse. In this way not much time is given by the optometrist to each case. Abduction and adduction are both exercised if necessary, but the patient should never be started exercising both at the first visit. Accommodation is sometimes improved noticeably by this method of exercising adduction, and as most cases of weak convergence also show weak accommodation the entire muscle tone of the eyes is improved. Exercising abduction frequently relaxes spasm of accommodation and convergence both, permitting an increase of correction when accommodation had apparently been weak, but where there had actually been an undercorrection.

To better understand how diagnosis and treatment as outlined, can be carried out, we will take a number of cases of different types that have been treated recently and follow the treatment as given.

Case 1. A. T. P., age twenty-nine, health good, complained of a bad ache around and behind the eyes, and blurring of vision. There was considerable conjunctivitis. He was wearing O.D. + 0.50 D. Cyl. axis 90, O.S. + 0.25 D. Sph.() + 0.50 D. Cyl. axis 90. His correction was found to be O.D. + 0.50 D. Cyl. axis 90, O.S. + 0.25 D. Cyl. axis 90. It required only plus fifty to neutralize with motion at sixteen inches with the retinoscope, so accommodation was ample. Tonicity tests showed orthophoria at twenty feet and six degrees of exophoria at thirteen inches, so these gave no clue to the trouble. Adduction at infinity was only 3 degrees and abduction 3. The near point of convergence was six inches, so a diagnosis of convergence insufficiency was easily made and duction exercises decided on. The lack of more exophoria in the near point test was due in this instance, to the strong accommodation. He was given the correction indicated for treatment glasses, and twice given exercises in the office to relieve the aching, then started on home exercises. He was given two 10 degree prisms and one five, instructed in exercising for adduction and told to report in three days. When he returned he showed some improvement. He was given in addition a 15 degree prism and told to return in a week, or sooner if he could back away from the light with 25 degrees. He was also given a 4 degree prism to exercise abduction. He returned in six days

having mastered both. He was given another 15 degree prism and told to return in a week or sooner if he could overcome the total of 50. He was also given 5 degrees for exercising abduction. At the end of the week he could fuse the fifty, but abduction was still sluggish on the five. He was now started exercising for speed by placing and removing the prisms while standing twenty feet away from the light, and kept exercising abduction until 6 degrees was attained. The correction was then found to be the same as given for treatment. Relief was complete. The ache, discomfort and blur were completely relieved, and the conjunctivitis disappeared during the treatment. The entire treatment covered six weeks and very little time was taken up in the office.

Case 2. F. E. B., hotel clerk, age thirty-nine, was sent by his physician on account of an unsteadiness in walking. Whenever he turned to the key rack and back to the desk he would be compelled to hold to keep from falling. Eyes aching and sore. He had recently recovered from "flu" and his physician pronounced him all right. He was wearing O. D. —0.50 D. Sph. () + 2.00 D. Cyl. axis 90, O. S. — 0.50 D. Sph. () + 2.00 D. Cyl. axis 80, which gave him 20/20 vision. No improvement could be made in his correction. Accommodation was found to be normal. Distance showed exophoria of 1 degree and at the near point 12 degrees. At 20 feet the abduction was 4 and the adduction 6, at near point 10. Here, then, was the trouble, in his weak convergence. He was treated for convergence and abduction, and the unsteadiness disappeared. No change was made in his correction.

Case 3. Miss G. L C., stenographer. Eyes itch, burn and become inflamed. Was wearing O. D. + 1.25 D. Sph. O. S. + 1.00 D. Sph. which I had fitted two years previous. Distance esophoria 3 degrees, near exophoria 2 degrees. As there should be a physiological exophoria of five, this equaled an esophoria of three at the near point. It required O. D. + 2.50 D. Sph. O. S. + 2.25 D. Sph. to neutralize the with motion at sixteen inches. Adduction was fourteen, abduction two. Here, then, we had clearly either a weak accommodation or an undercorrection. She was given O. D. + 1.75 D. Sph. O. S. + 1.50 D. Sph. for treatment glasses, which blurred distant vision, and started on home exercise for abduction. Abduction was built to six and it was found that O. D. + 1.50 D. Sph., O. S. + 1.25 D. Sph. was the most that could be given without blurring distant vision uncomfortably. Her symptoms were relieved and the eyes became comfortable in her work.

No attempt has been made in this article to cover fully the treatment of eye strain. Volumes might be written and the subject still be not covered. An endeavor has been made merely to outline the methods by which the eye functions can be investigated in as practical and quick a manner as possible, to make a diagnosis of the eye's condition. To give the author's method of home exercises, by which much time is saved, in the hope that more optometrists will be encouraged to give greater attention to muscle treatment.

OPTOMETRIC EQUIPMENT

F. McFadden, Opt. D. F.A.A.O.

Athol, Mass.

If you were asked how much weight you could lift would you start in by successively lifting and laying down weights increasing by one-pound or five-pound intervals? Your muscles would be fatigued beyond any reasonable capacity long before you had reached a normal "batting average." If you were asked how far you could walk in a day would you repeat this process of making mile-laps, tiring yourself by spurts and foolish speed exertions? Yet this is exactly what happens in the "loose-leaf" method of changing lenses by the loose-lens method. If we are working upon re-

fraction, whether with the skiascope or subjectively, the constant "zero drop" intervals between lenses brings about more fatigue than any other method we could possibly devise. Indeed this becomes such cruel punishment for a great many of our consultants that they dread coming to us, far more than having their teeth drilled, plugged and hammered by the dentist. We can and do introduce the most excruciating torture upon a great many people by this tedious and unnecessary method, and we are not getting the best results in so doing.

By the way of the Unit Instruments, all these changes are made in just as natural a manner as that of increasing our own crystalline lens power by bringing an object toward us, or carrying it away. In doing this there are no "zero-drops" upon the accommodation, with all the hazards they introduce. Moreover we can easily keep both the eyes open, working them in a natural team, just as they work in everyday life.

This holds just as true when investigating ocular poise, for the old round loose-prisms had always to be removed, a zero-drop allowed; then a more powerful prism introduced, up to the possible "breaking-point of single binocular vision." This latter phase, however, hadn't any real meaning because the breaking point came long before the limits of lifting-power, and we never suspect it unless we have the phorometer or kratometer which will add a slow and gradual load to the limit of endurance—when this is **necessary.**

In all work on ocular poise it is strictly essential that the eyes fix upon some object in a definite direction and known distance, for if allowed to range about the room the angle varies constantly, the power is constantly changed, and results are inaccurate. The phorometer makes all this error impossible. Its readings are accurate, evenly divided between the eyes, and do not require to be made up, by adding together prisms of unequal amounts and dividing them, or possibly adding up several prisms from which certain subtractions must be made.

Loose prisms are difficult to set accurately in a trial frame and the slightest deviation of a round prism from its proper base-apex line will introduce more disturbance than we can even guess at. The slightest deviation often introduces a hyperphoria and this in turn greatly disturbs accommodation, which in its turn now influences an excess of esophoria or exophoria—a "vicious cycle of events."

There are people who have a habit of tilting their heads. At times this is natural and functional, while at other times it is freakish and indulged in coquettishly. But there are pitfalls in these pranks, for a hyperphoric condition is instantly set up in tilting, and this stimulates accommodative activity. In many instances the accommodation becomes freakish and inconsistent between the two eyes. The trial frame and loose lenses so frequently seen in ill-equipped optometric places will allow the patron to indulge in all manner of pranks of this kind. These things are not only tiresome to the refractionist, but they cost him a great many dollars in work to be done over. They cause him a loss of prestige.

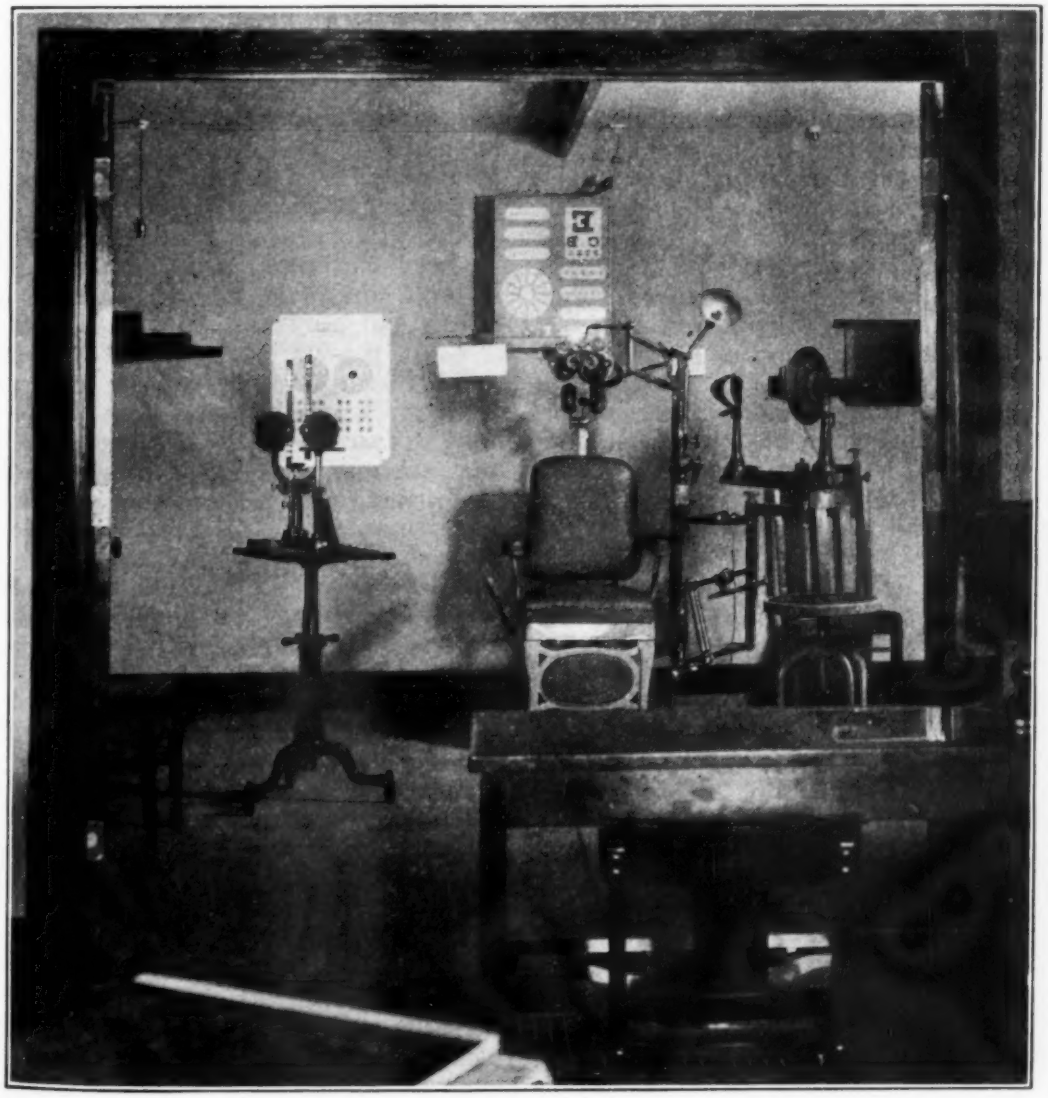
SUGGESTED ROUTINE IN OPTOMETRIC EXAMINATIONS

C. A. Perigo, Opt. D.,

Fremont, Neb.

PART I.

The writer has been requested to propose a practical routine of procedure in making optometric examinations. May I suggest at the outset that many Optometrists will not consider my suggested routine as suitable in their own practice. This does not discourage me in the least for since very few of us think alike on any subject it is not to be expected that our ways of doing things should differ any the less widely. It is no more necessary that every Optometrist who reads these lines follow exactly the routine herein suggested than it is that one must partake of every article



ONE END OF DR. PERIGO'S REFRACTING ROOM

of food on the table when sitting down to a meal. However none of us should be so bigoted as to think that our own routine is "par-excellence." When one reaches that stage he has begun to stagnate; so beware! I wish to flatter the members of the Optometric profession in general to the extent that I consider them all seekers after truth. You know it is only by maintaining an open mind toward the ideas of our associates that we are enabled to improve our technique and thus make progress in our profession. So the routine hereafter suggested should be considered merely as a guide, not a hard and fast method of procedure.

Name and Age and Occupation

We will presume a patient has presented himself and signified his willingness to undergo an examination at our hands. After the patient is comfortably seated it is in order to obtain the name, address, age and occupation. These items are sufficiently closely related, I believe, to be considered under one head. A very important item of the four above mentioned is the occupation. The distance at which the patient uses his eyes the most, is a fact vital to the matter in hand. Let us consider these three men; a tailor, carpenter, taxi-driver. We'll suppose they are at the same presbyopic stage, yet it would be idle to say that we must give each the same reading addition over and above his distance correction. It is often well to have the patient actually demonstrate the distance at which he expects to see comfortably with the glasses we give him, and when he does this we should actually measure the distance with a tape measure.

Now in our office we are fortunate in having a young lady assistant. She is present during the entire examination and makes a record of everything of note that transpires during the examination. She is seated back and to the left of the patient and has control over the illumination of the test chart and the lights in the refracting room by means of switches near at hand. She records the findings of the Ophthalmometer, the Retinoscope, results of all Phoria tests, the evidence shown by the cross-cylinder test, in fact all important data. This leaves the operator free to manipulate all instruments and the examination can be performed in half the time it would otherwise occupy.

History

If it happens, as it sometimes does, that I am detained with a previous patient while fitting a frame or making a minor adjustment, the assistant takes the waiting patient into the refracting room and notes down the four items mentioned in step number one above. She is also trained to inquire intelligently as to any history that may have any relation to the case. Should I be detained longer than is expected, she engages the patient in conversation on general topics. This last has a very beneficial effect for I have noticed with young female patients the presence of a young lady assistant makes them feel more at ease and such a feeling bodes well for a successful refraction.

In taking history endeavor to make the patient be as definite as possible. For instance a headache should be described as to exact location, usual duration, time of onset during the day, occupation of the patient just previous to the attack, whether sleep relieves the headache, whether a headache may follow a long ride in a car, whether a the patient gets up with a headache; if so is the patient subject to head colds, does the patient have a chronic discharge from the nose, does the patient spend more or less time each morning upon arising in clearing the head and throat by expectoration? Positive answers to the last four questions should put the optometrist on his guard as to making any definite promise of relieving the headaches by glasses. Also they would furnish sufficient grounds for an Optometrist to satisfy himself by transillumination as to whether the patient may have sinus trouble. If I am treading on anybody's toes in the last statement, I will say merely that I hold these two things to be self-evident: I can't know too much about my patient; and I can't find it out too quickly.

Patient's Previous Glasses

The writer in his next step seems to practice in direct opposition to universally accepted standards. If the patient before me has been using glasses, I ask to see them I immediately satisfy myself as to the kind

of lenses they are and their strength. I announce to my assistant the lenses the patient has been using and she records it. There are very good reasons, in my opinion, for this procedure. Let me give an illustration: A doctor is called to treat a case of violent poisoning. Can he not administer antidotes more quickly and effectively if he is informed at once the exact kind of poisoning he is expected to treat. Of course, given time to study his patient he can determine for himself the proper method of treatment, but while he is doing this valuable time may be lost. And so in my optometric practice when a young person of school age comes to me complaining of blurring vision or headache at study and he produces for my inspection a pair of minus lenses (poison, no less) I have almost certainly discovered in the third step of my examination the cause of the trouble. Further, let me state that if a man has backbone enough to stand on his own findings, he'll not be unduly influenced any more by the patient's old lenses before the examination than he will afterwards.

Visual Acuity

I believe all authorities will agree that recording of the visual acuity is one of the first important steps in an eye examination If the patient wears glasses constantly, the visual acuity should be taken with these glasses on. Then the glasses should be removed and the visual acuity taken again monocularly and binocularly. Sometimes the binocular vision is not as good as monocular. This condition may be suggestive of a high degree of astigmatism in one eye or possibly a muscular imbalance. If the distance vision of either eye is much below par it is in order to apply the pinhole disk to determine whether it is possible to improve the vision of that eye. In either case I have the assistant record the result of the pinhole test. Let it be noticed that as yet I have not touched the patient for it is of extreme importance that the operator get a record of the visual acuity of the patient before touching any part of his person. Even the pinhole test can be performed by the patient holding the disk for himself while occluding his other eye. At the risk of diverging from the main thread of my discourse I will mention a fact here which may be of interest to some. If cataract is suspected in any case, let the patient approach a window and view the sky through the pinhole disk while held about eight inches from the eye in question. If the opening is round and free from opacities or dark spots, cataract is unlikely. If opacities are within the circle, cataract is in process of development.

Cover and Fixation Tests

With young patients I consider cover and fixation tests very appropriate at this stage of the examination. Now we know that the average young person, in health, should have an ample supply of accommodation for ordinary purposes; and if a patient of this class who has not been wearing glasses confronts us, it doesn't need a Philadelphia lawyer to know there is an inherent weakness some place. He may have a deeply latent hyperopia too great for his accommodation to adequately surmount, and this is apt to be accompanied by a prominent tendency toward over-convergence. If the patient is asked to fix on some small object like a hatpin while the operator moves it slowly toward the patient's nose, any tendency toward excessive convergence will become manifest if the operator alternately uncover each eye while the patient is fixing the hatpin. The same test will of course uncover any tendency toward exophoria. If the test object is held six inches from the patient's eyes and he is required to fix the object for thirty seconds, any weakness of the interni will be detected by a quivering of the eyes as they make a supreme effort to maintain fixation. If the interni are flagrantly weak one eye will vert outward in spite of all the patient can do. By moving a fixation object back and forth before a patient's eyes and carefully noting the excursions of each eye in the different directions we can determine whether paralysis of any muscle is present. If there is a marked limitation of rotation of an eye in any one direction, the muscle controlling that movement is probably paralyzed and prism treatments will be of no avail. We have now completed the preliminary steps of our examination and in our next installment we will take up the first step of the examination proper, The Phoria Test.

(To be continued)

CASE OF PARTIAL EXOTROPIA SHOWING RAPID RECOVERY

J. Haustein, Opt. D.

Red Wing, Minn.

Patient, Mrs. J. N., age 31, came to me first on February 20, 1925. Her case history showed that all near point work was difficult and that at times she was troubled with diplopia. She had, however, by experimenting, found out that she could, by nearly closing her eyes for a short period of time, relieve herself of this diplopia whenever it annoyed her, and in fact she had become so used to this, that, had it not been for the actual difficulty in reading she would have probably continued without an ocular examination.

Her monocular visual acuity was 20/20. A complete refraction disclosed but a quarter of a dioptre of hyperopia. She had from 10 to 12 degrees of exophoria, or what at times would be exotropia, at a distance and a similar amount at the near point. Oculo-prism treatments were at once suggested and prescribed, the patient being able to fuse from 7 to 15 prism dioptres base out, during the first treatment. The following day the patient started with 12 prism dioptres, and was able to increase this to 29 prism dioptres base out. The tonicity test disclosed but six dergees of exophoria or I guess we must still call it exotropia as the patient still complained of diplopia. On February 23rd the patient started by fusing 20 prism dioptres, and increased this to 34 prism dioptres base out, before the treatment was over. She now had but 1 degree of exophoria and her diplopia had apparently disappeared. On the 27th she again returned for her fourth treatment. She was able to fuse 28 prism dioptres at the start and 44 prism dioptres base out at the finish. She now had but I degree of exophoria. On March 2nd she again returned, this time starting her treatment by fusing 40 prism dioptres, and holding 50 prism dioptres base out at the end of the treatment. Upon making the tonicity test, we found a condition of almost orthophoria. The patient returned for three more treatments, on March 4th, 6th and 9th, the conditions being relatively the same as on March 2nd, and when discharged showed no exotropia or exophoria and had an adduction of at least 50 prism dioptres.

Early last fall, she had occasion to come into the office, and said at this time, that she had at no time experienced any diplopia or the distressing symptoms which had bothered her for years before the treatments had been prescribed.

This case of muscular imbalance is both unusual and interesting because of its rapid recovery and because of the permanence of the cure. Oculo-prism treatments were the only relief measures which could have been prescribed with any chance of success, and it was decidedly gratifying to have them work out in such a splendid, speedy manner.

PRACTICAL NOTES AND CURRENT REFRACTIVE TOPICS

R. M. Peckman, Opt. D.,

Waterbury, Conn.

THE INTERPUPILLARY DISTANCE

It is the custom, in measuring the interpupillary distance, to measure from the nasal edge of one pupil to the temporal edge of the other, and to make up the glasses with the optical centers of the two lenses separated by the measurement thus obtained.

This measurement, if carefully made, is the distance between the corneal poles, or the optic axes of the eyes. But it is not the distance between the visual axes. For the visual axis penetrates the cornea slightly to the nasal side of the corneal pole, about 0.5 mm. on the average.

The angle between the optic axis, which extends from the corneal pole to the posterior pole of the eyeball, and the visual axis, which extends from macula to object of regard, is called the "Angle Alpha." This angle varies in individuals. If it is very wide, the person seems to have eyes slightly divergent, or if this angle is very narrow, one could swear the person has a convergent squint.

In general, it is wise to deduct about 1.0 mm. from the measurement obtained by the usual system, and to make up the glasses with the optical centers separated about 1 mm. less than the distance between the nasal edge of one pupil and the temporal edge of the other pupil.

A HINT FROM A CLIENT

The other day, a young man who was ordering a new pair of glasses in a zyl frame, asked if "They couldn't be made without that white line around the lens." Questioning developed that he meant the matt surface of the bevelling, which in strong lenses is noticeable, although we have never thought of it as being unsightly, just taking its presence as a matter of course.

To please him, we had the bevel polished, and the result was truly a decided improvement in the appearance of the glasses.

It has been the custom of the writer, whenever quite strong lenses are used, to have the lenses so bevelled that the major part of the bevel is behind the rim. This makes a much more sightly job than to have the bevelling centered, projecting equally on both sides of the rim. To this custom, we shall now, thanks to the criticism and suggestion of this observant young man, have the bevels of strong lenses polished. We believe that no detail is too small or unimportant, if by attending to it we can make a better looking or a better fitting pair of glasses.

CONVERGENCE INSUFFICIENCY

Our old text books called exophoria and convergence insufficiency synonymous. Now we know that convergence insufficiency has nothing to do with the phoria. We find just as many cases of convergence insufficiency with accommodative orthophoria as we do with accommodative exophoria.

Convergence insufficiency is not a "Muscular trouble." It is the inability of the Central Nervous System to make the proper distribution of innervation and inhibition, to group together those muscles that should be innervated simultaneously and at the same time separate them from association with those muscles that should be relaxed, or inhibited.

Convergence insufficiency in older people, in invalids convalescent from such febrile diseases as diphtheria, influenza, etc., in those affected by alcoholic or other chemical poisonings, in those afflicted with focal infections from decayed teeth or tonsils, in those suffering from high blood pressure and other systemic disease, is a form of neuritis, due to toxemia, and resulting "in loss of associated control over muscles that are normally synergistically innervated."

Convergence insufficiency in healthy young people, with normal ocular motility, who are able to turn both eyes together in any direction, is arrested development, a survival, or "Vestigial Trace" of the visual habits of our primordial ancestors to whom convergence was unnecessary and unknown.

Convergence insufficiency is easily treated by Kratometer exercises, developing the proper innervational habits. But these exercises should not be given to those invalids of the types mentioned above, until the disease that caused the trouble has been cured.

ILLUMINATION

Illuminating engineers are finding that they must study the eyes and their light requirements. But we, whose business is the care of eyes, have not awakened to the fact that we must study the same thing. The fields of the two professions overlap. at first, it seemed that they came only in slight contact at one point. But as we go on, we find that we have much in common and that we ought to work together.

We have much information that the illuminating engineer needs to use in his daily work. He has much that we need. The illuminating men have gone much farther on the road toward meeting us than we have. In fact, we haven't started out to meet them, yet.

Membership in the Society of Illuminating Engineers is open to optometrists who are genuinely interested in these important problems. Attendance at the regular monthly meetings held by the different sections all over the country, and subscription to their technical magazines with study of the articles therein appearing, cannot fail to help the progressive optometrist.

The writer would be greatly pleased to hear from any optometrist who wishes to put himself in position to know more about illumination. We here reprint a few paragraphs from one of the illuminating profession's magazines.

Lighting Practice Should be Designed for Subnormal Eyes

Intensities of illumination are generally far from adequate for perfect or "normal" eyes. To increase the intensity to the high level most suitable and economically desirable for workers with normal vision is such a formidable task that little thought has been given to intensities necessary for the best efficiency of workers whose vision is subnormal. Apparently it has been assumed that subnormal eyes are in an insignificant minority. However, the truth seems to be that the majority of workers' eyes are not perfect. Evidence to this effect has been accumulating of late through systematic eye examinations. Furthermore, it has been found that defective eyes require a greater intensity of illumination than normal eyes for seeing equally well, if this is possible at all. Correcting refractive errors by means of glasses is to some extent equivalent to increasing the intensity of illumination; but there is enough evidence to indicate that average eyes, even if corrected by means of glasses, require more light than normal eyes to attain equal facility in seeing.

Many statistics of eye examinations have been published, among the most recent being those obtained by the United States Public Health Service in two New York post-offices. These are sufficient to illustrate the great prevalence of eye defects. The eyes of two thousand five hundred employees were examined with the following results: Normal or no defects, 17.1 per cent; one refractive error or more, 73.7 per cent; one inflammatory condition or more, 14.5 per cent; one muscular unbalance or more, 25.6 per cent; using glasses, 35.6 per cent. These percentages are startling, but approximately the same results have been obtained in other investigations, and a glance at the bespectacled contingent in any gathering is enough to convince one of their accuracy.

It is not surprising to those who have reached the "bifocal" stage in life that the percentage of nearsightedness and other eye defects increases as the average age of a group of workers increases. The percentage of normal eyes decreases rapidly beyond the age of forty years. In lighting practice this means that a relatively higher intensity of illumination should be supplied in those industries where skilled labor is important, because, in general and up to a certain point, skill is acquired with age. Thus it is seen that

the prevalence of defective eyes over perfect or "normal" ones makes it necessary in the practice of lighting that special consideration be accorded to them.—Electrical World, January 23, 1926.

SPECIAL REPORTS

A COMPLETE SERVICE

Phillip J. Beyhan, Opt. D., F. A. A. O.
Niagara Falls, Canada

The word "service" is beyond doubt the most abused substantive in our language; the crimes committed in its name, or by a distorted conception of its meaning are legion. In the profession of optometry also we find that sad misunderstandings have crept in as to the real significance of that term and its application to those who come to us for attention. The thoughts appended were occasioned by the reading of an article from the pen of Dr. A. B. Howard of Ware, Mass., appearing in the January issue of this publication, wherein he takes exception to the use by us of certain extra-ocular tests.

To begin with: I heartily endorse the article by "one southern practitioner." That the thoughts therein set forth are not tenable at this time for several reasons is granted, but what of the future? Who among the practitioners of a quarter of a century ago would have dared to predict that ere the passing of another twenty-five years every state in the Union and Province in Canada would have laws restricting the practice of "fitting glasses" to a selected body of men who should prove their fitness by rigid examinations held by men appointed by the chief executive of those states and provinces? I warrant not many would have dared to so prophesy, but it has come to pass. Are we then to set limits on our advancements of the future? I trust not. There is a vast difference between the practitioner in the downstairs location, particularly if that be in conjunction with some other form of business, and the man upstairs who tries to bring into his relationship with his patients all that is meant by the term professionalism. More, much more, is expected of him in the way of knowledge and if he is to hold his prestige, he must live up to the expectations held of him. It is not plain to me how, permission to remove foreign bodies, and render a limited field of service along those lines, interferes with the practice of medicine or is entering that honorable profession by the back door, front door, side door, window, or any other aperture. Our only difference with medicine is that we set forth the claim that eyes may be examined and exact prescription given without the use of a cycloplegic; we do not claim that we can cure anything that is acutely pathologic without the use of drugs. I score the idea that "the southern practitioner" had any thoughts of presenting himself as anything else but an optometrist; if my suspicions are correct and I believe they are, the man referred to is one of foremost men in the profession and is primarily a 100 per cent optometrist and uses no other term but that wherever it is desirable to express his professional status. He is merely one of those in the vanguard of the future, one of those who sees beyond into the coming days, just as those in the past, some of them at least, saw ahead to our day and were glad of the vision.

The removal of foreign bodies is a point that I think should be taken up at once. May I be pardoned some personal allusions by way of illustration? My office is upstairs and located on a street the opposite side of which is formed by the main line tracks of a transcontinental railroad. There is no medical man within an area of five blocks the other therapeutic gentlemen in the vicinity are dentists. Now, this is a prolific situation for people to get cinders in their eyes from passing trains. I have been standing at my window when a train passed and seen some person suddenly clamp one hand to their eye and proceed to look hurriedly for something.

Have you ever noticed in the comic strips those dotted lines that denote especial attention being directed toward some object? It seemed to me that I could see those same dotted lines coming from the eye of that person and impinging upon my sign! Straight across the street and upstairs on a run and into the office. As one fellow said: "Doc, I got the world in my eye." (I took out four cinders!) The usual thing is: "Are you the eye specialist?" Supposing I hadn't seen what had happened a minute ago. We all know that in the minds of the laity any person who restricts their work to the eyes merits that title, from some at least. If I say: "No," the patient may reply: "Oh, I wanted to have my eyes examined, sorry to bother you. Good afternoon." That would be a catastrophe! Supposing I say: "Yes," thinking of course it is a refraction, then that person tells me what is wrong and I have to hem and haw and crab crawl out of it. "Surely, I am an Eye Specialist (I just admitted it!), but you know I can't take that little piece of dirt out of your eye—you will have to consult a medical eye specialist." Isn't that humiliating? I usually say in reply to the first inquiry: "I am the optometrist." As a rule though the person is suffering so much pain that they haven't time to meditate upon subtle distinctions in words—there's something in that eye and it has to come out! If I do remove the obstruction—and I usually do—it takes a few moments of my time, and, very frequently in the midst of an examination, for you know how painful a thing it is to have a particle in your eye and I have sympathy for the sufferer, then the patient says: "How much?" What can I answer? If I charge him for the time and service I am violating a law, if I don't I am wasting time that I am morally entitled to remuneration for from the person taking it. The occasional case is right enough but when that happens several times a day then those few seconds each time amount to something in the aggregate. Are we as optometrists going to be prohibited f r o m doing something which any man on the street can do with a dirty handkerchief? Perish the thought! You say we are not trained. Why not? It didn't take me long to learn the technique of the work. A few hours instruction from a competent man at a clinic or convention and then practice in everting lids is all that's required. Asepsis of course is requisite but that is also a matter of a little common horse sense and application of the first principles of cleanliness.

If the resolution passed by the A. O. A. "prohibiting these extra ocular tests" meant anything it might be worthy of some consideration but to hurl an anathema as general as it is reputed to have done and then having practically every public clinic under, either the direct supervision, or countenance of that body using extra ocular explorations as a part of the routine makes the matter take on a rather ridiculous aspect. It doesn't seem to me that we are in any danger of becoming physicians by extending our field of service, no more at any rate than the dentists and from the present appearance of their profession they are still maintaining their individuality. Progress means motion. Have we arrived at the end? Has optometry reached the finality of its fitness for service? If so then I am for getting into something that still has room for advancement. Our laws? Are they like those of the Medes and the Persians, unalterable? It would have been foolhardy indeed to have incorporated, as a general part of the work some of the advance ideas that are being suggested now, into the earlier laws that were passed. Let some of us fellows who have only been out even a matter of a few years, three like myself, try to pass the next State B o a r d examination in California, where I passed mine in 1923! Unless I had at least a semester of preparation I am quite sure I would make a miserable failure, why? Optometric instruction has advanced even in that short period, a measurable pace. First: prepare the student for the work, then examine him in his fitness, then change your law if necessary to permit him to do that for which he has been trained. "Ite excelsior!"

I believe that a man should be trained in the use of any additional instruments he may elect to use—to do otherwise would be the rankest of charlatanism and to be deprecated above all things; if he is trained to

use the instrument and to interpret his findings then he should be given the right to use it. Now, mind you, there are extremes in everything and I am not advocating anything extreme. The sphygmomanometer is a valuable instrument, I do not use one, but I have in mind some cases which I would use one on if I had it. Your ophthalmoscope will give you some information but your sphygmomanometer will give you more. Eye strain may give rise to symptoms which are referable to the heart, or may be so interpreted by the patient, a check test by the sphygmomanometer will verify anything of this nature. Regarding urinalysis though I am frankly of the opinion, at present, that that is rather beyond the field of optometry, if the individual practitioner wishes to acquaint himself with it and use it that is strictly his affair and I don't see where he would be trespassing upon any other field.

By far the most valuable adjunct to extra ocular investigations has been made by the invention and perfection of the transvisualization method (Cameron) for studying conditions of the teeth, nose, sinuses, mastoid and antra. Recently I had a lady coming to me for ocular attention, her principal symptom was a peculiar form of headache which seemed to be in the left temporal and parietal regions —she referred it to her eyes. Transvisualization showed a darkened mastoid region, she was sent to one who gave her the proper attention and I was glad to have that medical man call upon me and express himself as favorably impressed with the service I had been fortunate enough to render. Teeth, tonsils, sinuses—I meet them frequently, I was almost to say daily, and am able to give some constructive advice for the future care of that person. In the above mastoid case, though I am inclined to feel that exuberance of feeling prompted the remark, the advice I had given was woman's life. Did I render a service? At least I had hoped to.

In fine: it does not mean that we are to become expert diagnosticians, nor need we communicate our diagnosis or suspicions to the patient, when we use extra ocular tests. We are dealing with an entire human beconsidered as second only to the surgery it led up to in the saving of the ing, the eyes are only a part of that entity, and the most sensitive part of it too; conditions which have their roots deep down in the system leave their imprints on the eye in its functions or as landmarks on the retina or iris. It is my humble opinion that the science of iridiagnosis is only in its infancy and that future investigation will bring out further applications of this information. We cannot know too much about the eye or the entire human body for the matter of that. The more we know the better we are equipped to render a complete service. Regarding the matter of borrowing from other professions—science, genuine real science is above petty considerations of borrowing and lending. Don't you think medical men have availed themselves of some of the discoveries of optometry? None but the uninformed would aver otherwise. They are welcome to them so long as they use them properly and I am sure that the broad really true blue men of that honored calling feel the same toward us and I am optomistic enough to feel that they are glad if they are able to contribute to the aid of suffering humanity any instrument, regardless of whose hands employ that means so long as its purpose is served. Let us not be radical or biased either on the one side or the other—too apt to pick up every fad that comes our way, or on the other hand too tardy in adding to our armamentarium any additional means which will enable us to give to our patients that maximum of service to which they are entitled.

ABSTRACT DEPARTMENT

Optometric and ophthalmic Journal articles and reprints to be abstracted should be sent to Dr. G. L. DuPlessis, 209 Yeates Building, Minneapolis, Minnesota. Only papers of interest to optometrists will be reviewed in this department.

Tobacco-Alcohol Amblyopia. Cossu A. Bolletino d'Oculistica (Italian), 1923, Vol. 2.

The author gives statistics of 512 cases of Tobacco-Alcohol Amblyopia found in 72,000 patients or 0.72% (women 0.002%). Influence of refractive errors: Hyperopia 43.8%; emmetropia, 40.6%; myopia, 15.6%. These figures agree with those of other observers. Of the 512 cases, 12 were monocular; 10 in the left eye, 2 of the right eye. Age: from 21 to 70 years with the majority between 41 and 50. Season: maximum in spring, minimum in winter. The development is progressive especially since the war. Treatment: bromine and iodine medications were found to be of benefit.

G. L. DuP.

A New Record Card. P. J. Beyhan. The Canadian Optometrist, Vol. VIII, No. 1, pp. 25-26. 1926.

Three lines for case history with separate spaces for notations regarding teeth, tonsils, and sinuses; the recorded visual acuity; space for ophthalmoscopic examination data and for the findings of the ophthalmometer; static and dynamic record spaces; place for subjective data; and near and far point accommodative, tonicity and duction test are all given proper placing on the Beyhan record card. In addition he has reserved space for post-refraction data, he calling these subsequent refractions "check tests."

T. O. B.

Plural Measurements of Vision. F. McFadden. The Optometric Weekly, Vol. XVI, No. 44, pp. 1940-1941. 1926.

McFadden discusses the various forms of recording visual acuity and deplores the fact that the records are nearly always without the data regarding the intensity of the illumination at the time the findings were taken.

He suggests the acuity should always be taken at a ten meter distance, using two mirrors if necessary and under a reflected illumination of 10 candlepower with daylight lamps.

T. O. B.

Various Pains Associated with the Eye. L. Crawford. The Optician (British), Vol. LXX, No. 1811, p. 312. 1925.

Crawford outlines five more or less common types of ocular pain, giving causes as follows:

1. A sharp gritty sensation, as of a foreign body in the eye; variously described according to its severity as itching, stinging or burning. It always seems worse in the evening and in artificial light, and is apt to be aggravated by late hours, cold winds, heated air, and smoky rooms, etc.

This is the pain of conjunctivitis, and is associated with sticky secretion, which glues the eyelashes into bundles, and may gum the lids together so that on waking the patient has to bathe the eyes before he can open them.

2. Pain of a shooting, darting, throbbing character, not so much in the eye as in the forehead, temple, etc. It is often of the greatest severity and is at its worst in the small hours of the morning. The patient may sleep till 2:00 or 3:00 a. m., then waken with violent pain, and get relief about 6:00 or 7:00 a .m. This is the pain of iritis, and of all acute affections in which the ciliary tract is involved.

3. A feeling of weight and heaviness in, or rather behind, the eye; the patient feels "as if his eye would drop out." There is little or no secretion.

the infection is limited to a part of the circumference of the cornea, and is of a violet or purplish tint. This is the pain of scleritis.

4. A peculiar form of pain called photophobia, or dread of light, in which the patient manifests a desire to exclude light from the eye as much as possible. He closes the eyelids tightly, may cover the eye with hand or arm, with handkerchiefs or muffler; and will resist vigorously any attempt to open the eye. There is copious lachrymation. This is the pain of superficial affections of the cornea, and is worse the more central and the more superficial the lesion is.

5. A form of pain known as asthenopia, or eyestrain—uncomfortable vision. This assumes many forms, the commonest being frontal headache. There may be swimming in the head, giddiness, and other forms of bodily discomfort. The special error which gives rise to asthenopia is usually an optical one, such as hyperopia, astigmatism; but it may also be muscular.

T. O. B.

The Hydraulic Mechanism of Accommodation. Noiszewski, K. Archives d'Ophthalmologie (French), August, 1925.

Noiszewski's theory is as follows: During accommodation, the circular ciliary muscle compresses the fluid in the posterior chamber; this fluid inclosed in the chamber by the contraction of the sphincter pupillae compresses in its turn the equator of the lens. The aqueous humor flows from the anterior chamber at the filtration angle, but the fluid from the posterior chamber cannot reach this outlet owing to the obstruction due to the contracted sphincter of the iris. Therefore the pressure in the anterior chamber is lowered and the higher pressure in the posterior chamber compresses the lens. The only part on which the increased pressure in the posterior chamber cannot exert an effect is the anterior pole of the lens, unprotected by the iris. Owing to the lowered pressure in the anterior chamber, this expands and becomes more convex.

G. L. DuP.

A New Theory of Accommodation. Johnson, L. G. Archives d'Ophthalmologie (French), December, 1924.

After a brief exposition of Helmoltz' theory, the author presents his own as follows: The two ciliary muscles contract and draw forward the choroid and compress the ciliary processes which are pushed into the circumlental space by the muscle of Muller. This exerts a pressure on the fluid filling this space and as fluids are incompressible, the capusule must yield. The posterior surface of the lens resting on the vitreous does not change while the anterior surface becomes more convex. As soon as accommodation is relaxed the fluid flows back into the anterior chamber. Thus, according to the author, is the change of curvature of the anterior surface of the lens produced by hydraulic pressure, and not as explained by Helmoltz.

G. L. DuP.

Percentage Value of Vision and the Snellen Notation. Gabriels, J. A. C. Archives of Ophthalmology, Vol. LV, No. 1.

The summary of this article is here reprinted:

1. Snellen notations are fundamentally relative values. 2. Snellen notations primarily represent losses in visual efficiency. By deductions the remaining visual value or efficiency expressed is concurrently set forth. 3. Snellen notations in numerically uniform ratios do not denote corresponding visual values. 4. The relative values are expressions of the relationship of any constituent part with an incomplete whole. 5. The absolute percentage loss values express the relationship of any given partial loss with the whole or total loss. 6. The absolute value corresponding to any Snellen notation is determined on the basis of measurable practical visual acuity, and varies according as the lower limits for this is conceived. 7. The relative value for any given Snellen expression, appertaining as it does to the normal, is constant and unchangeable. 8. From the industrial viewpoint, both horns of an annoying dilemna may be taken in hand—that is, a satisfactory point of blindness and suitable ratings for the first losses.

G. L. DuP.

A Subjective Method of Skiascopy and Its Applications. Sheard C. American Journal of Physiological Optics. Vol. 7, No. 1.

This paper as the name implies presents a method of subjective testing using skiascopic principles. With a suitable object, as a wire, moved from side to side before his eye, the patient is asked to state the movement of the spatial shadow as he fixes a source of light. The test can be made under a number of varying conditions with the interposition of stenopaic holes, slits, colored filters, etc.; however, though optotypes are dispensed with, and an accuracy of 0.12 dioptre is claimed, these advantages are somewhat offset by its lack of rapidity and the reliance upon the patient's keeness of judgment. Still these inconveniences might be removed by improved instrumentation and technique. Another advantage deserving mention is that this method may be applied to find subjectively the optical needs of a pair of eyes for various or all points of fixation from 22 feet to one foot.

Experimentally, Sheard by this subjective method, confirmed the chromatism of the eye and plotted curves showing this chromatism in different regions of the optical media of his own eyes. He found that the interval of Sturm is achromatic at the reading distance. The article is profusely illustrated and a description of the apparatus used is supplied.

G. L. DuP.

Prevention of Crystalline Opacities by Means of the Ophthalmometer. Ryer, LeRoy E. American Journal of Physiological Optics. Vol. 7, No. 1.

Ryer believes that corneal astigma corrected by sectional accommodation is an accompanying factor in the aetiology of cataract. He refers to that class of cases where the ophthalmometer reveals an astigmatism "with the rule" not manifested by retinoscopy, but later changing to "against the rule" without any change in the cornea. As in this type of cases cataract is often found, he advocates careful and unprejudiced investigation as there is a possibility of preventing an incipient cataract. The author advises the conservative correction of the corneal astigmatism in an effort to uncover the latent sectional astigma much in the same way that we uncover latent hyperopia with convex lenses.

G. L. DuP.

On the Enlargement Caused by Binocular Vision and its Role in Relief Perception. Bard. Archieves d' Ophthalmologie (French), 1921, p. 513.

Bard starting with the observation that a near object seen with one eye alone seems smaller than when seen with both eyes, shows that the apparent enlargement takes place in three dimensions. He presents the following explanation: Due to the converging position of the eyes, the retinal pictures do not fall on absolutely corresponding areas. The total picture transmitted to the brain is hereby enlarged and consists of a common nuclear picture with the marginal portions coming partly from each retinal picture.

G. L. DuP.

Notes on Myopia. Drualt-Toufesco. Annales d'Oculistique (French), 1922, p. 865.

The author has studied the hereditary nature of myopia and presents the following points in its favor. Repeated appearance in relatives who live under entirely different conditions; absence of a demonstrable cause which might act before or after birth; the fact that the anomaly follows Mendel's law, and finally that it often occurs in connection with other anomalies He has collated observations on 275 families of myopes, of which 186 presented congenital anomalies. He divides these families into six groups, and in each distinguishes a certain number of kinds of hereditary transmission which are demonstrated through the compilation of a large number of clinical histories. In the myopic families, the ametropia shows a tendency to grow worse, particularly in the males. As the result of his studies he believes that we are powerless to prevent the hereditary form of myopia.

G. L. DuP.

Some Pecularities of Vision of Squinting Persons. Tron, E. Kli, M. f. Augenh. (German), July-August, 1925.

Tron found in monocular strabismus, divergent or convergent, an unilateral contraction of the visual field in the horizontal meridian. In strabismus of an angle larger than 25° this contraction occurs on the side to which the eye squints; of an angle smaller than 25°, on the opposite side. There is no contraction of the borders of the visual field in alternating strabismus. In amblyopia from strabismus, peripheral vision suffers less than central. The isopters have the same courses in squinting as in the normally fixating eye with the difference that in the normal eye they are situated farther to the periphery. The unilateral contraction of the visual field is an abnormal correspondence of the retina and may be regarded as indirect proof for amblyopia-ex anopsia.

G. L. DuP.

A Preliminary Report on the Retinal Vessel Scotoma. Evans, J. N. American Journal of Ophthalmology. February, 1926.

The author presents a description of a most interesting experiment not without diagnostic value. This consists in the mapping on the campimeter of the retinal vessels. Accidently the author found that on taking the central field, the retinal vessels produced a flicker as the smallest exploration object (1.5 mm.) was passed across the field. In this way he succeeded in mapping out the vessels without difficulty (?). The report is illustrated with a picture of the slate showing the retinal vessels scotomata. These are clearly outlined and show the retinal circulation remarkably well. The possibilities of this mode of investigation are well worth investigating.

G. L. DuP.

A Case of Homonymous Hemianopsia. F. S. Oliver. The Optician. (British) Vol. LXX., No. 1817, p. 411, 1926.

The patient, a man, some 63 years of age, has been troubled for some little time with incomplete left homonymous hemianopsia. The scotomata, which are very roughly pear-shaped, encroach upon the macular border, surrounding it above and below, to the median line.

Wernicke's sign might not be conclusive with limited scotomata, but directing the light as carefully as possible on to the amaurotic areas, the indication was of a lesion posterior to the corpora quadrigemina.

The unaided vision in Right eye is 6/9, and in Left eye 6/24—, and is slightly improved with a spherical correction of O.D.+0.5: O.S.+1.0.

In searching for the cause of this 18384-E-W44603 CC 3-26 THREE visual defect Oliver finds one diagnostician suggesting Plumbism, however he finds the tests for this negative. Another suggested Optic Nerve Atrophy, but Oliver rules this out feeling it impossible with a bi-lateral homonymous lesion. A third assigns the causation to one of the "maladies veneriennes," though there is no evidence of this and the only previous history is of a slight urethritis some 45 years ago.

The present treatment is in accordance with the last diagnosis and consists, besides distance lenses, in an iodide and salicylate mixture internaliy, with mercurial inunction nightly to alternate temples.

It would be interesting, says Oliver, assuming the correctness of the diagnosis and the wisdom of the remedy, to know why the inunction should be done bi-laterally for an obviously unilateral cerebral lesion; and it is of more than passing interest to the patient, an otherwise strong and healthy man, to know what are his chances of recovery. To one dependent on his sight for his livelihood, the prognosis is a very important matter.

T. O. B.

Preliminary Work on a Diagnostic Scale for the Form Field. Ferree, C. E.; Rand, G. and Monroe, M. M. American Journal of Ophthalmology. February, 1926.

This paper is the first one of a series on perimetry. In former studies by two of the present writers, the factors which cause variations in the forms and colors fields were determined and methods and apparatus were devised for their control. This has rendered the use of perimetry for

the advance and recession of a pathologic condition comparatively simple and easy. The use of perimetry in diagnosis, the other important application to clinic work, could be made easy if the same degree of control could be exercised over the factors which cause the results to vary from eye to eye. This degree of control has not yet been secured and probably can never be secured. At present the outstanding problem is perimetry, therefore is diagnosis.

The first step in diagnosis is the differentiation of the pathologic from the non-pathologic eye. In case of the form field this differentiation is based on two phenomena: changes in the size and extent of the field and changes in the shape of the field. Size of field, it is obvious, is more affected by the non-pathologic factors which vary from eye to eye than is shape of field. The effect of these factors on size of field is to increase the range of variations for the non-pathologic eye and the tendency to overlap the range for the pathologic eye. For example the amount of contraction of field produced by a defect or refraction in a non-pathologic eye may be as great or even greater than that produced by an incipient pathologic condition in an emmetropic eye. In the use of perimetry for diagnosis it becomes necessary, therefore, to make for the non-pathologic eye a careful determination of the range of variation of field for all of the outstanding, uncontrolled variables and for as many of them separately as is possible in our present state of knowledge. The knowledge of what is an average field, for example can contribute but little to the diagnosis of borderline cases for which the help of perimetry is most needed.

It has been the purpose of the present study to determine the range of variations of the form field for the non-pathologic eye for a stimulus subtending an angle of one degree. The cases studied were sampled to include as many as possible of the outstanding variables which are non-pathologic. Two of the most important of these are age and condition of refraction. A scale has been formed showing the range of variations of field under the influence of these variables and the distribution or frequency of occurrence of the different sizes of field in a typical non-pathologic group. Such a scale provides a means of placing each new case in the class or subgroup to which it belongs rated with regard to the distribution of normal cases, i. e., it constitutes a diagnostic scale for use in the separation of pathologic from non-pathologic cases. In the formation of this scale it has been necessary that a single value or index be chosen to represent extent of field. A number of values has been tried. Of these, average breadth of field and area of field in sq. cm., of maps drawn to standard scale and measured with a planimeter were finally selected as the most feasible and satisfactory for office and clinic work. It might also be remarked that in the 200 cases used to arrive at these figures it was found that in general hyperopes and emmeopes have the narrower.
tropes have the larger field while my-

G. L. DuP.

On the Search for Scotomata. Kuemmel. Zeits. fur Aug. (German), No. 4, 1922.

The author advises to take the visual field twice in the search for scotomata. The first exploration is made from the visible region towards the scotoma, while the second is made inversely. The second method will always give greater dimensions for the scotoma. This difference is probably explained by the relative slowness of the mind in recognizing the change of impression, especially the first change. However, there is at the limits of the scotoma a zone of relatively defective vision. This zone seems to be greater for the blind spot scotomata than for the central.

—G. L. DuP.

THE AMERICAN JOURNAL OF OPTOMETRY

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Original papers, scientific communications and correspondence should be addressed to the Editor. Books for review should be sent to Dr. E. O. Fjelstad. Clinical Reports and Society Proceedings should be sent to Dr. J. I. Kurtz. Practical Notes and Current Refractive Topics should be addressed to Dr. R. M. Peckham, Waterbury, Conn.

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DR. JACK I. KURTZ, Room 209 Yeates Building, Minneapolis, Minnesota.

The Journal has no objection to the reprinting by other magazines of any of its articles, provided such reprints are properly credited to the American Journal of Optometry.

RESEARCH

Once again we find ourselves urging organized research by optometry. Much individual study and research has been and is being done, but many individuals find that this sort of work takes far too much time from their practices. The New York Times recently carried the following, which, although having no bearing on optometry, is offered as a suggestion upon which organized research in optometry may be developed.

"The trustees of the National Research Endowment, recognizing that human progress depends in large degree upon research in pure science, declare their conviction:

"(1) That the United States, which already occupies a leading position in industrial research, should rank with the most enlightened nations in the advancement of pure science.

"(2) That it is wiser to make large expenditures for scientific research, thus advancing civilization, improving human welfare, conserving health, and saving countless useful lives, than to tolerate unnecessary suffering and then endeavor to alleviate it at still greater cost.

"(3) That research in all branches of the mathematical, physical and biological sciences should be encouraged, because of the intellectual and spiritual value of adding to knowledge and because the greatest advances in science and in industry often result from apparently useless abstract discoveries.

"(4) That scientists exceptionally qualified to widen fundamental knowledge through research are of such value to the nation that every effort should be made to facilitate their work.

"(5) That the overcrowding of educational institutions, and the consequent excessive demands of teaching and administration, have further reduced the limited opportunities for research previously enjoyed by the members of their faculties.

"(6) That the funds now available for the support of research in pure science in the United States are far below what our population, education and material resources demand.

"(7) That the National Academy of Sciences, created by Congressional charter, the scientific adviser of the government, and composed of leading investigators in the closely interlocked and mutually dependent mathematical, physical and biological sciences, is peculiarly qualified to evaluate the needs of pure science in America, to stimulate its progress and to insure the widest use of funds provided for research.

"In view of these considerations, the trustees of the National Research Endowment, established by the National Academy of Sciences, propose immediately to secure adequate funds for the encouragement of research in pure science."

Optometry is in no way ahead of any of the other phases of scientific endeavors and it behooves us as professional men to organize and to fully back efforts to further ocular knowledge through scientific research work.

—E. O. F.

THE VISUAL SURVEY AND SERVICE CORPORATION

A booklet, fully explaining the work of the Visual Survey and Service Corporation, has been prepared and will be sent to any optometrist who has been registered by examination, who requests same. Dr. Barr reports that the work on this visual educational program is moving rapidly forward and urges qualified optometrists to join with him in bettering their knowledge of refractive technique. Requests for information should be addressed to Dr. F. P. Barr, 406 Ward Building, Rochester, N. Y.

OPENING AN UNTOUCHED FIELD

It is interesting to learn that for the first time a color test and traffic signal teaching device will be operated and demonstrated before an optometric group at Fort Worth, Texas, at their state convention in April.

This piece of modern equipment will be found quite welcome, as it provides a practical method of teaching the children and older students proper observance of traffic regulations. It is the intention, if plans carry through successfully, to make the tests for color blindness among students in the grammar grades and high schools. The interest that will come out of this new project will indeed be stimulating to the optometric profession. It will be the means of entrance into bigger fields educationally and along traffic lines where 20,000,000 motorists are dependent upon vision to guide them. Optometry need not go about shouting "Optometry" in order to make the profession known, but only seek and do the work that lies directly before them, and the good people of this country will shortly recognize the true worth of the profession.

—F. P. B.

BOOK NOTICES

New Books for review should be sent to Dr. E. O. Fjelstad, 209 Yeates Building, Minneapolis, Minnesota. Only Books of such nature as to be of interest to optometrists will be used in this department. Optometric and Ophthalmic publications that have been issued in the past and which are still procurable through their publishers will also be reviewed, from time to time, as space permits.

BOOK NOTICE

The Nervous System. By James Dunlop Lickley, M.D. Pp. 130, illus. 118. New York: Longmans, Green and Co. 1920.

This brochure, although not a new book, has a place in these columns due to it's contents, which, as expressed by the subtitle, form an elementary handbook of the anatomy and physiology of the nervous system for the use of students of psychology and neurology. To this we feel free to add that students of optometry can find much of value in it. The text is chosen to replace the many complete textbooks of anatomy and physiology whose purchase would be too great for the amount of material one would obtain on the subject. The central nervous system warrants an extended study on the part of the optometrist and this book fills the need of an elementary study.

The contents are: Chapter One, The Animal Cell; Chapter Two, Nerve Cells and Nerve Fibers; Chapter Three, The General Construction and Development of the Nervous System; Chapter Four, The Spinal Cord; Chapter Fve, The Hind-brain; Chapter Six; The Mid-brain; Chapter Seven, The Fore-brain; Chapter Eight, Chief Fiber Systems of the Cerebro-Spinal Axis; Chapter Nine, The Areas of Localisation on the Cerebral Cortex; Chapter Ten, The Sense Organs.

E. O. F.

REPORTS AND ANNOUNCEMENTS OF SOCIETIES

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NORTH DAKOTA OPTOMETRIC ASSOCIATION

Legislative Committee Appointed

President Sullivan has appointed five optometrists to act as a legislative committee in drafting a new optometry law. The appointees are: Dr. L. J. Anderson, Grand Forks, chairman; Dr. R. P. Merritt, Kenmare; Dr. F. W. Stanton, Dickinson; Dr. A. S. Anderson, Williston; and Dr. D. D. Sullivan, Fargo. All optometrists who have any suggestions for changes in the law that they believe will benefit optometry are urged to send them to the chairman, Dr. L. J. Anderson, N. W. National Bank Building, Grand Forks, N. D. The committee will meet sometime in May to consider the suggestions received and arrange the new revised law for presentation at the annual convention of the association at Grand Forks in August. Your support is necessary to put the law across. You can do your part by paying your dues promptly.

A. O. A. Convention

Your secretary has been requested to announce to the membership that the 29th annual convention of the American Optometric Association, of which we are affiliated members, will be held in San Francisco, Calif., June 28th to July 2nd. Special rates will be in effect on all railroads and many side-trips along the route have been planned for the optometrists who expect to attend. If you are interested, write to the chairman of the Transportation Committee, Dr. Louis Kuttner, Phelan Building, San Francisco, California.

Visual Survey Work in Public Schools

A visual survey was recently conducted by your secretary in the Williston schools. About 800 children were examined in all. Eye tests of this nature are being conducted in other parts of the country and they are doing much to establish prestige for optometry. If children are permitted to have contact with optometrists when they are young they will more than likely become patients of optometrists when they grow older and require optometric service. If you wish to conduct a visual survey in the schools of your city your secretary will be more than pleased to take the matter up with your school board, pointing out the benefits to be derived from a thorough visual survey and citing the work that is being done by optometrists elsewhere. Complete information regarding the method most commonly used in making eye tests of a large number of children in a limited time will be given anyone on request.

A. S. ANDERSON, Opt. D.,
Secretary.

OKLAHOMA ASSOCIATION

February, 1926

The annual convention will be held at the Huckins Hotel, Oklahoma City, April 19-20-21. The first day will be devoted to business, the next two to a clinic.

The postgraduate clinic, held at Tulsa recently, was a huge success. Practically every optometrist in eastern Oklahoma, as well as many other parts of the state, was in attendance. Dr. Hoare, the clinician in charge, proved a wonder. Everyone present was highly enthusiastic over the clinic, and the optometric methods demonstrated by Dr. Hoare, and expressed a desire for another clinic as soon as it could be arranged. For the use of the clinic a complete Genothalmic unit was furnished by the Riggs Optical Co., and a complete Wellsworth unit by the American Optical Co. An elaborate banquet was given the visiting optometrists at the Mayo Hotel by the Tulsa members the evening of the 13th. Dr. Hoare spoke at several civic club meetings.

A. O. A. CONVENTION

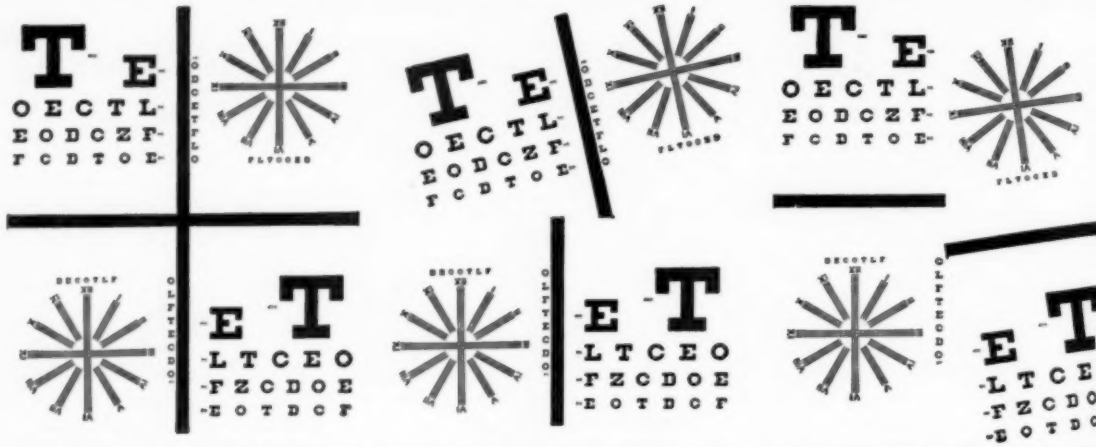
Plans for the National Convention of the American Optometric Association are rapidly developing, according to J. O'Connor, National Publicity Director of the Convention Bureau. Dr. H. Nordman has completed his entertainment and social arrangements and the educational features will be announced shortly. American optometrists are urged to attend this congress in San Francisco the week of June 28th to July 2nd.

NORTH DAKOTA BOARD

The North Dakota State Board of Optometry will hold a meeting in Fargo, N. D., May 3rd and 4th, at the Gardner Hotel for the purpose of conducting examinations and transacting any other business that may come before the board.

SPECIAL NOTICE TO MINNESOTA OPTOMETRISTS

Plans are being made to have all the Minnesota Optometrists, who intend to go to the A. O. A. convention at San Francisco, leave in a body in a special car. All Association members who contemplate attending the convention are requested to send in their names to the secretary, Dr. J. I. Kurtz, Yeates Building, Minneapolis.



You get a case that has been the rounds of "all the good specialists in the city"; no glasses have been found that give relief. You seat the patient before a chart like the above and bring the Hemisensory Binoculometer into position: promptly the patient reports conditions as depicted above. You at once recognize it to be esophoria, associated with a great cyclophoria. It is unmistakable, all doubt is thrown to the four winds.

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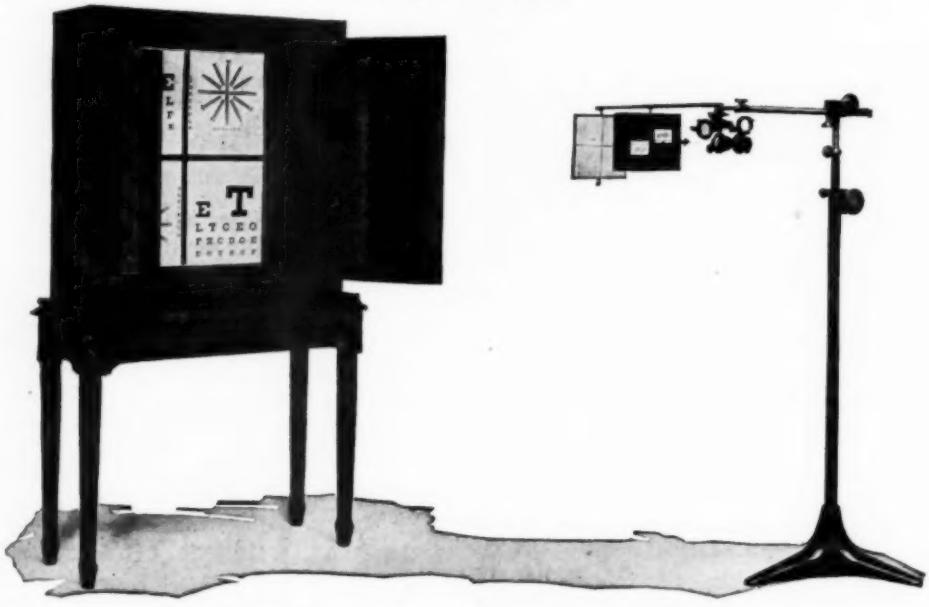

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